

# **Quality Function Deployment (QFD)**

## **Background and Principles**

# Quality Function Deployment (QFD)

Background and Principles

## **Expectations of Participants**

- **INTRODUCE YOURSELF TO SOMEONE YOU DON'T KNOW, OR WANT TO KNOW BETTER**
- **FIND OUT WHAT HIS OR HER MAIN OBJECTIVES AND EXPECTATIONS ARE FROM THIS COURSE**
- **INTRODUCE YOUR NEW FRIEND TO THE CLASS, AND SHARE YOUR EXPECTATIONS**

## **Premise**

- **QUALITY IS DEFINED BY THE CUSTOMER AND THEREFORE HAS NO MEANING WITHOUT REFERENCE TO CUSTOMERS**
- **A QUALITY PRODUCT OR SERVICE MUST MEET OR EXCEED THE EXPECTATIONS OF OUR CUSTOMERS**
- **CUSTOMER'S EXPECTATIONS ARE NOT OBVIOUS, AND ARE SOMETIMES HIDDEN UNTIL DISSATISFACTION IS EXPRESSED**
- **A METHOD IS NEEDED TO HELP UNDERSTAND OUR CUSTOMER'S EXPECTATIONS AT THE BEGINNING OF PRODUCT AND PROCESS DEVELOPMENT, AND THEN TO FOCUS ACTIONS ON CUSTOMER SATISFACTION**

# WHAT IS QFD

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**A Simple and Logical Process  
For Identifying What Customers Expect of a Product  
and For Determining How These Expectations  
Will Be. Satisfied**

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HIN

SHITSU

QUALITY  
FEATURES  
ATTRIBUTES  
QUALITIES

機能

KI

NO

FUNCTION  
MECHANIZATION

展開

TEN

KAI

DEPLOYMENT  
DIFFUSION  
DEVELOPMENT  
EVOLUTION

# What is a Product

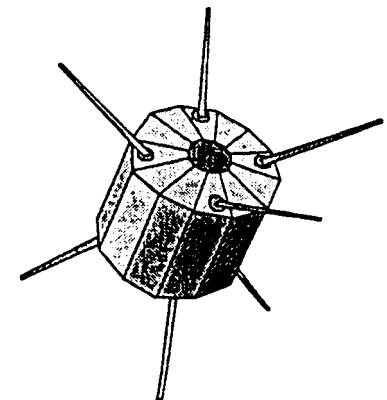
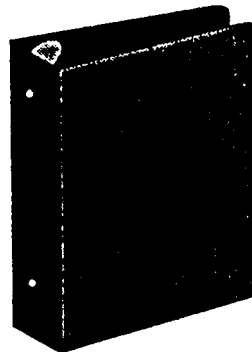
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## Characteristics of a Product

- Providing or Creating it requires the expenditure of effort.
- It is valuable to someone
- It may be either a service, hardware, software or information.

## Elements of Providing a Product

- Determining what is valuable
- The process of producing or providing a Deliverable
- The Deliverable.



# **Quality Function Deployment (QFD)**

- **QFD IS A SYSTEMATIC METHODOLOGY FOR TRANSLATING THE "VOICE OF THE CUSTOMER" INTO DESIGN CHARACTERISTICS AND TARGET VALUES THAT ARE DISSEMINATED TO ALL PROJECT PERSONNEL**
- **FIRST USED IN 1972 AT MITSUBISHI'S SHIPYARD IN KOBE, JAPAN, A ONE-OF-A-KIND OPERATION**
- **IT EMPHASIZES EARLY PARTICIPATION OF ALL DISCIPLINES IN PRODUCT DEVELOPMENT DELIBERATIONS AND DECISIONS**
  - **PROVIDES FRAMEWORK FOR CONCURRENT ENGINEERING ACTIVITIES**
  - **FACILITATES CROSS-Functional COMMUNICATIONS**



# What Are Some of Aerospace's Products

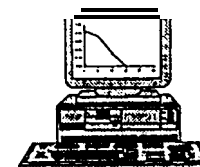
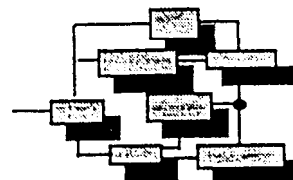
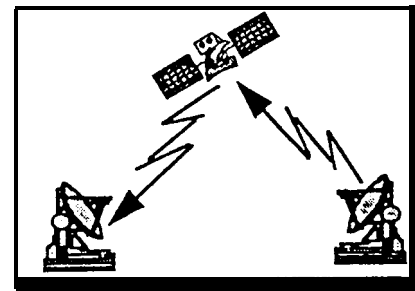
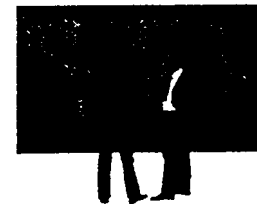
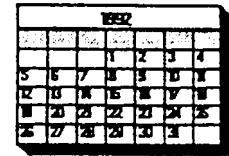
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## SERVICE ACTIVITIES

Design Reviews  
Management Reviews  
Readiness Reviews  
Contract Monitoring

## DELIVERABLES

Project Plans  
Conceptual Architectures  
Process Designs  
Baseline Designs  
Simulations  
Models  
Analysis Results  
Technical Tradeoffs  
Risk Assessments  
Briefings  
Documentation  
Technical Advice  
Programmatic Advice  
Hardware  
Software



# **What Does AFMC Say It's Product Is?**

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## **•Everything We Do in AFMC**

### **●What Is Delivered to the Customer**

- Hardware**
- Software**
- Services**
- Communications, Correspondence**

### **●Processes Which Make The Product**

- Design**
- Manufacturing**
- Modification**
- Repair**
- Test**

**- Air Force Material Command**

# What is a Quality Product

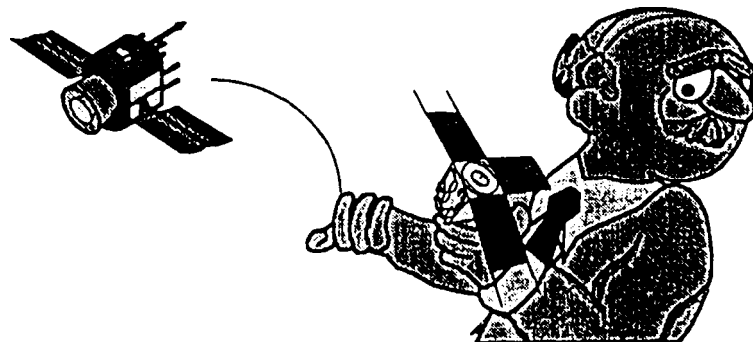
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A Quality product or service is one which:

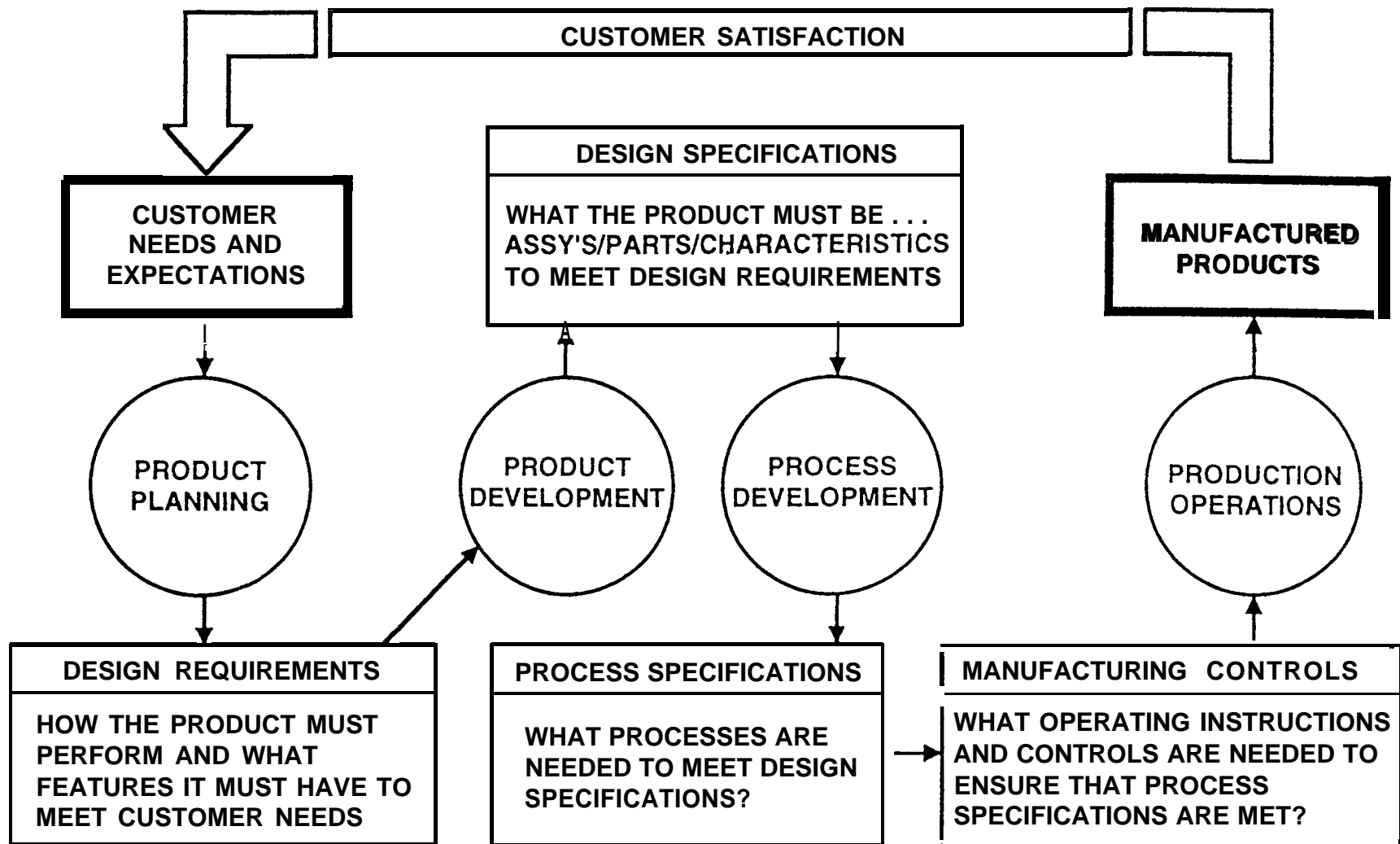
- Meets or Exceeds the Expectations of the Customer

## Elements of The Concept of Quality

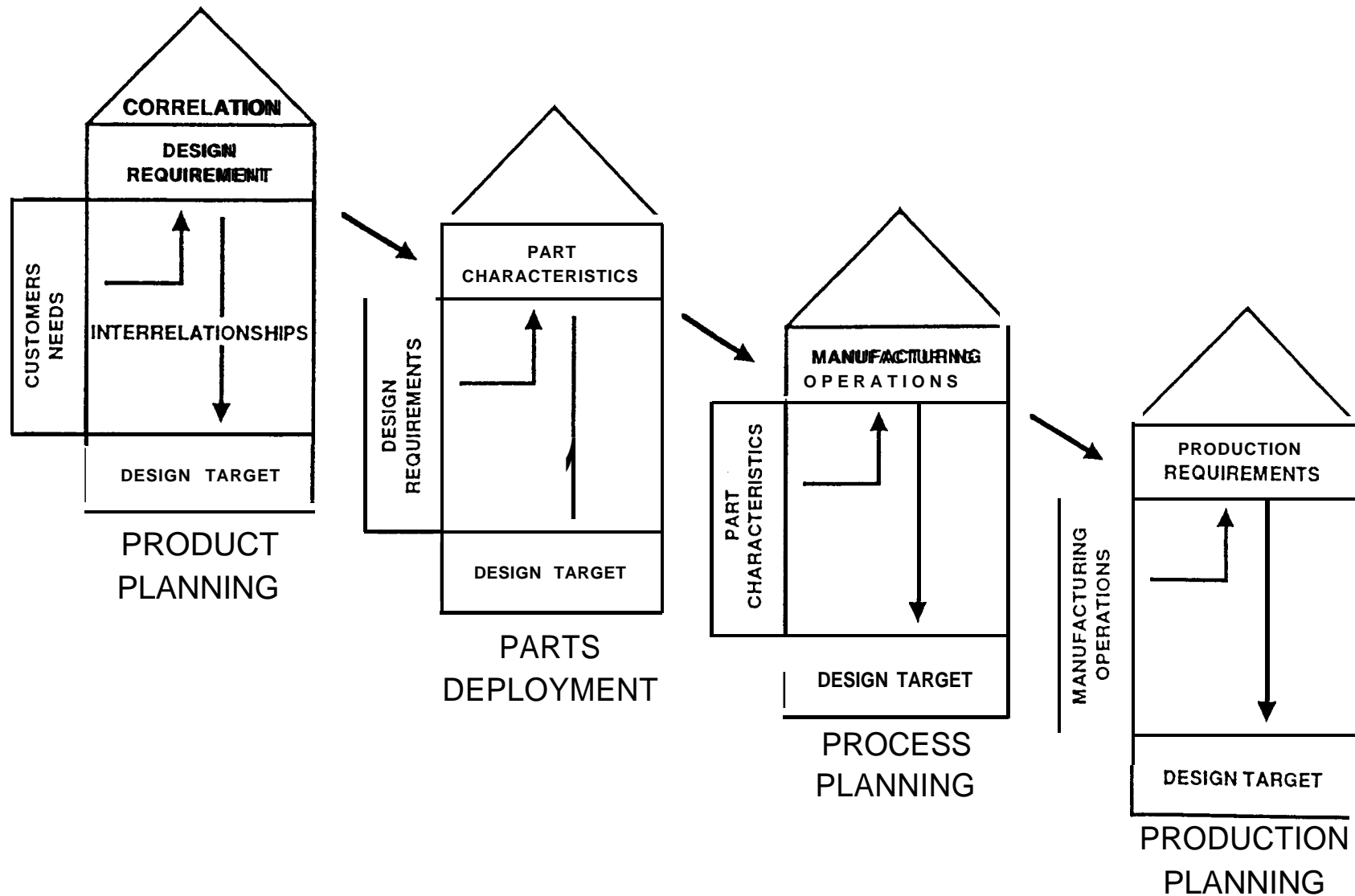
- Quality is defined solely by the Customer
- Customer Expectations are Complex and Not Obvious
- Customer Expectations are Sometimes Hidden Until Dissatisfaction is Expressed
- Failing to Meet Customer Expectations Results in Decreased Value



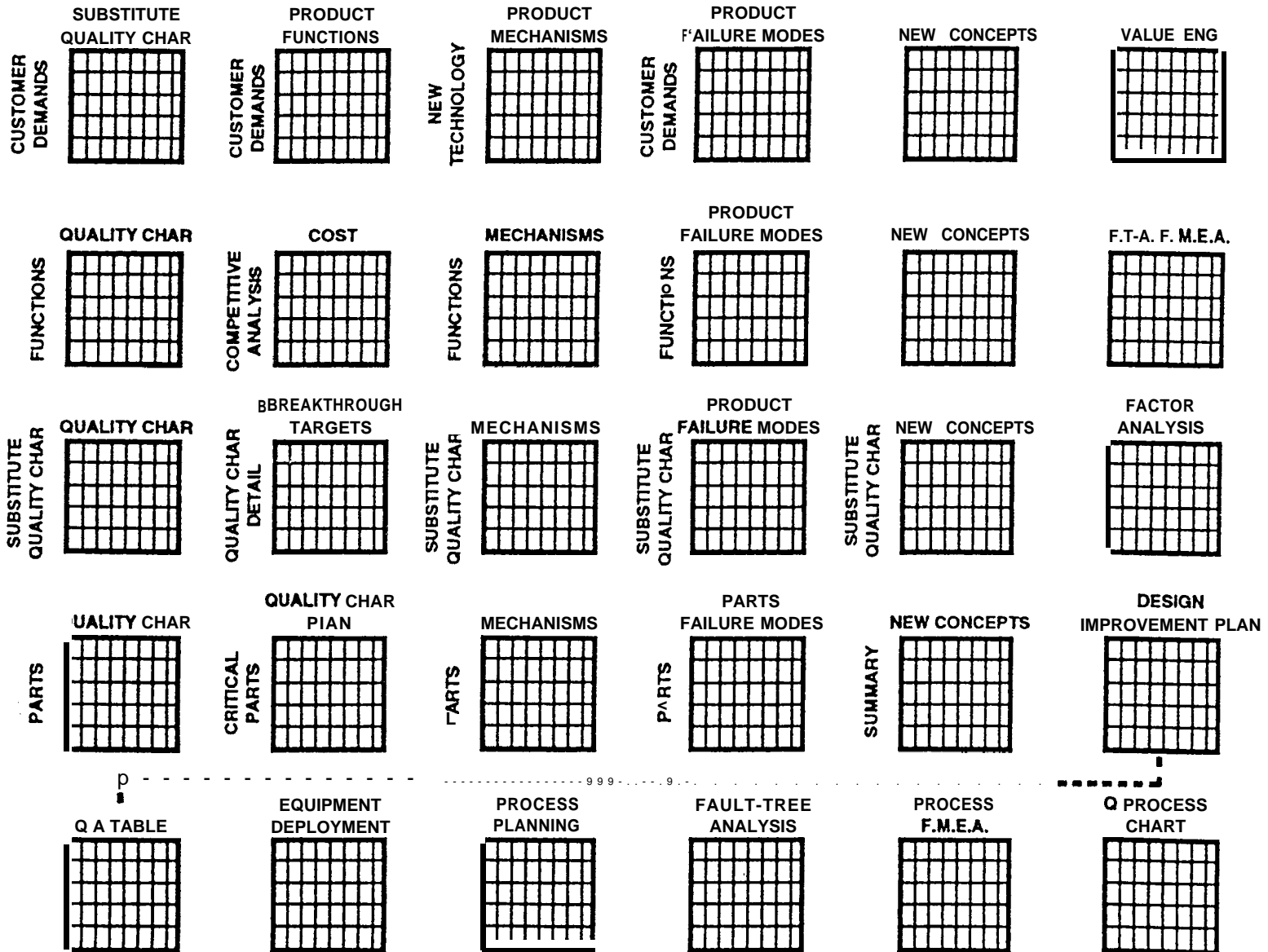
# What It Takes to Meet Customer Needs



# Quality Function Deployment



# Matrix Charts



# THE USE OF QFD

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- **Original Use**

- **For Hardware Development**
  - **Deployment of the “Voice of the Customer” Throughout the R&D Functions**

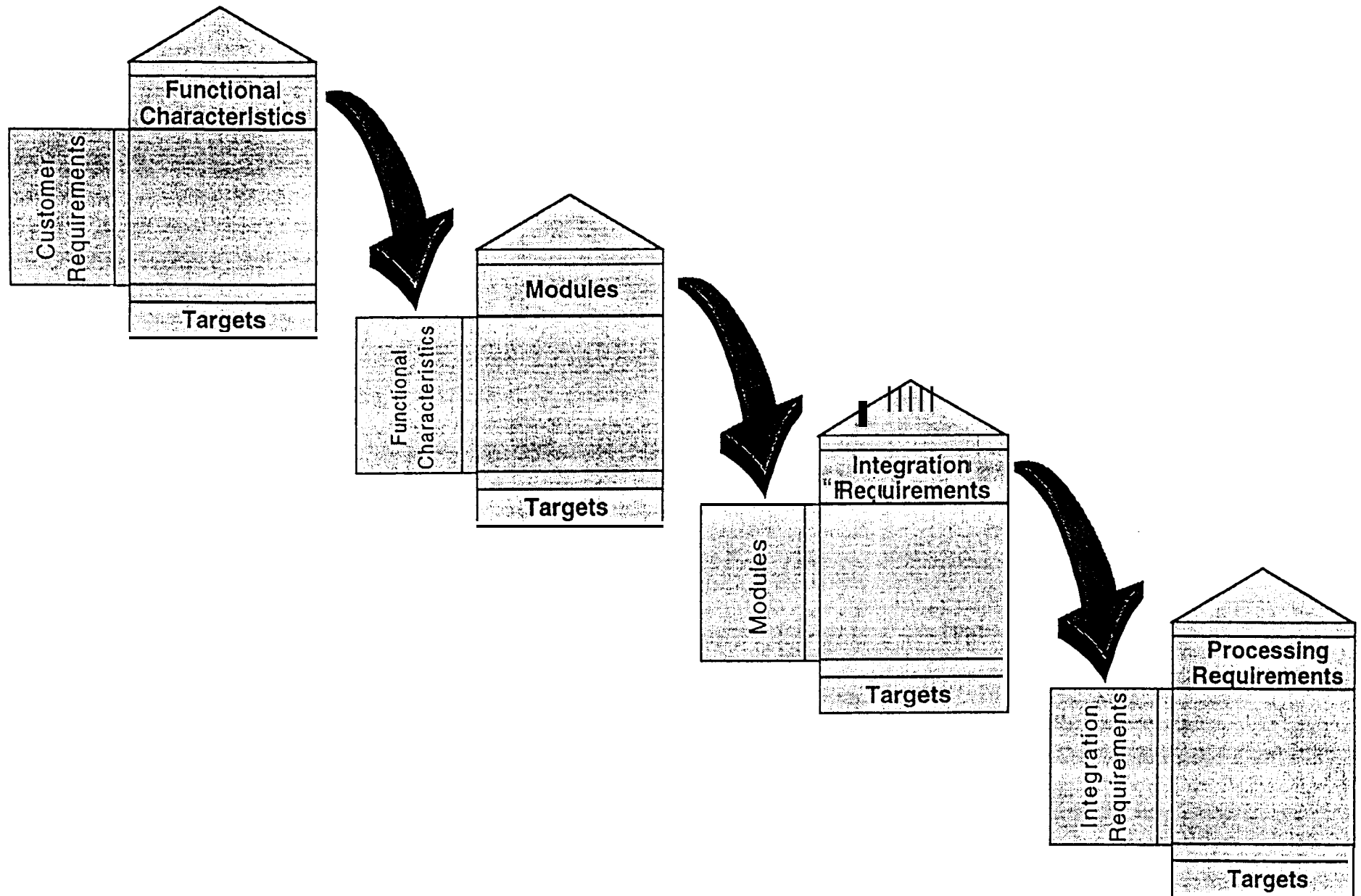
- **Other Uses**

- **Systems Planning**
  - **Customer Requirements Vs. System Characteristics**
- **Strategic Planning**
  - **Mission and Vision Statement Deployment**
- **Services and Administration**
  - **Service Actions to Meet or Exceed Customers’ Need/Expectations**
- **Software Development**
  - **Communicates Software Customer Needs for each Functional Area of Development**

# Multiple QFD House

## Software & Simulations

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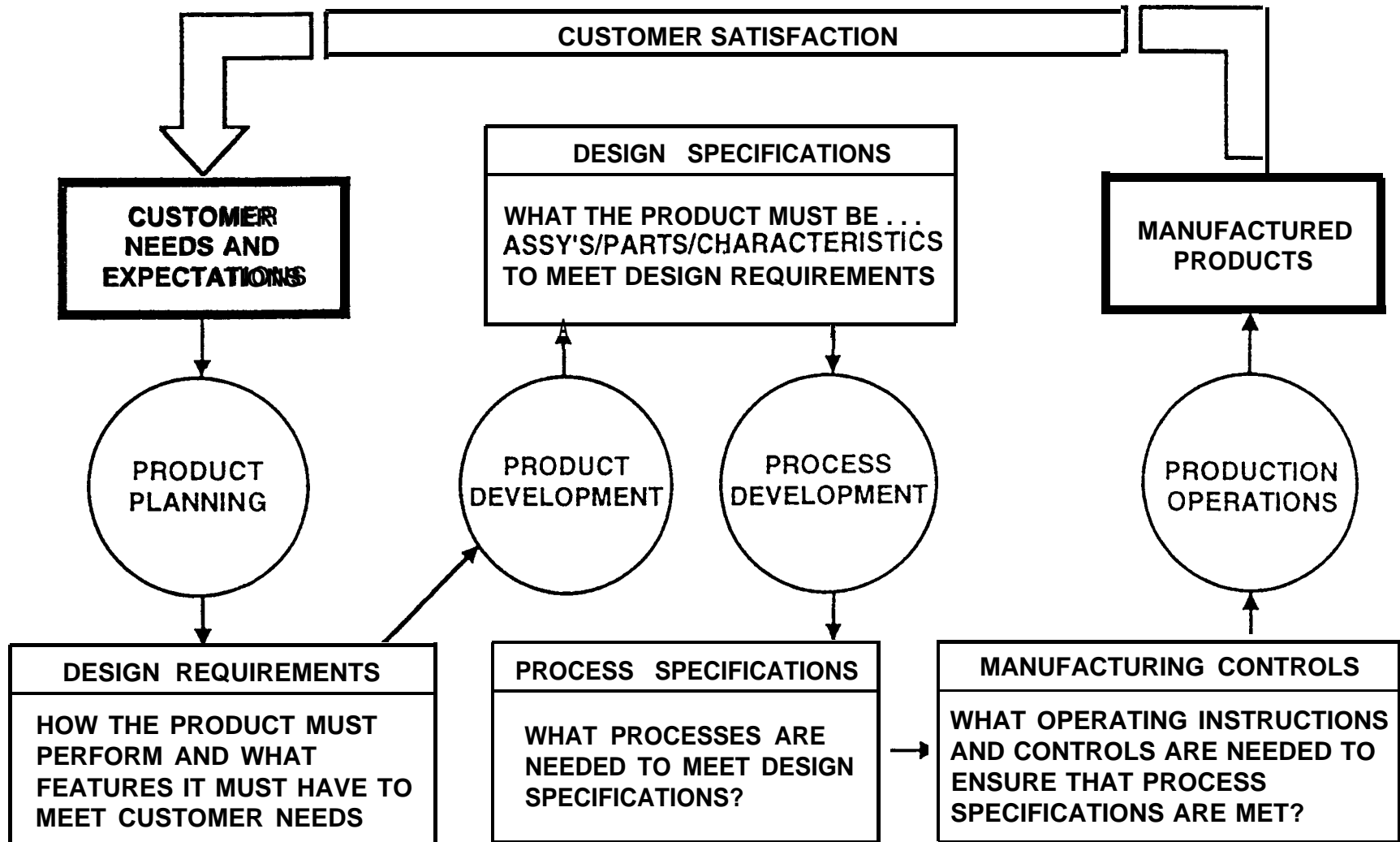




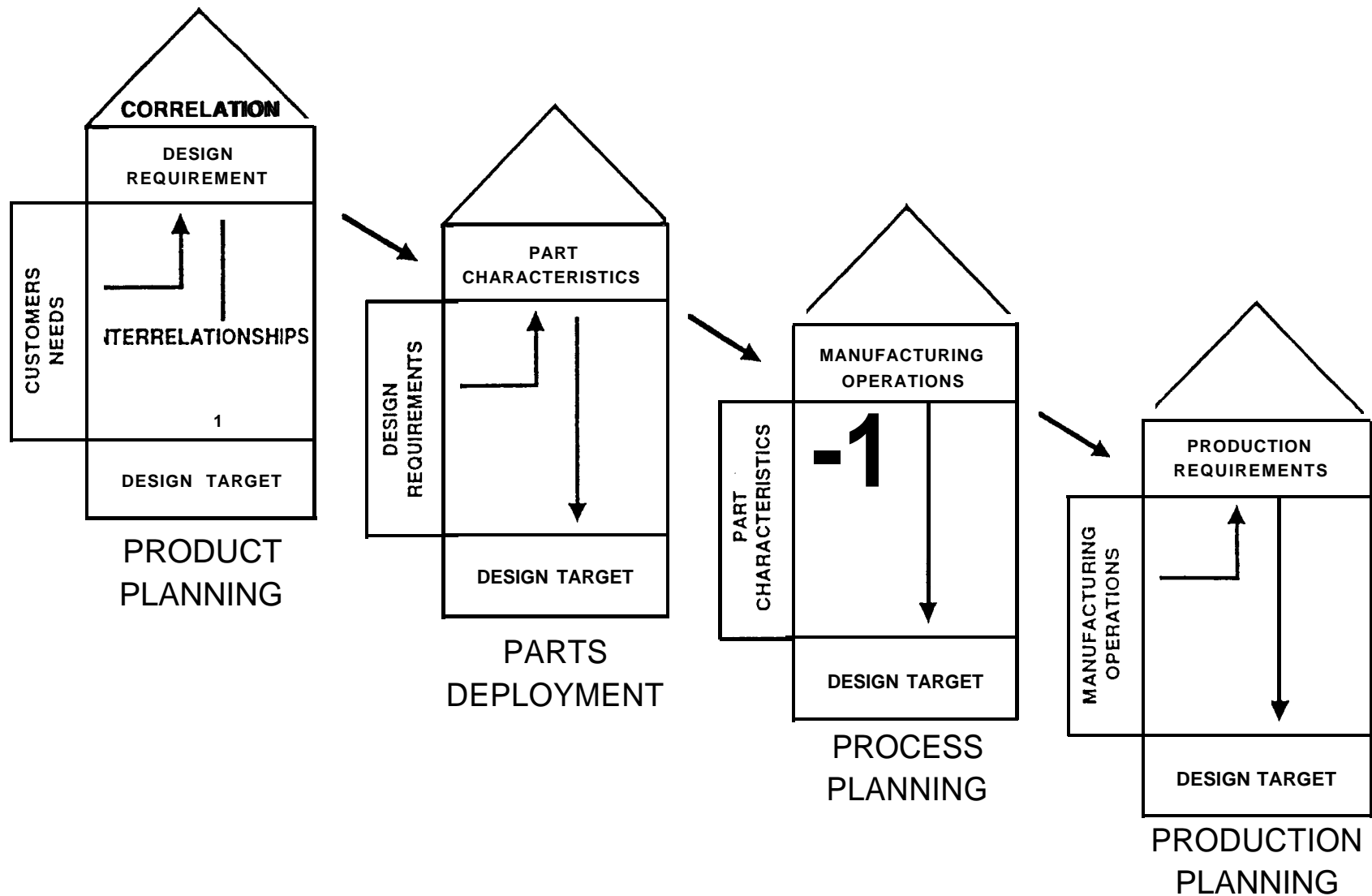
## **Corporate QFD Users**

- ✓ **ALLIED SIGNAL**
- ✓ **AT&T BELL LABORATORIES**
- ✓ **CADILLAC/GM**
- ✓ **CHRYSLER**
- ✓ **CLOROX**
- ✓ **COLGATE PALMOLIVE**
- ✓ **DIGITAL EQUIPMENT**
- ✓ **DOD**
- ✓ **EASTMAN KODAK**
- ✓ **FORD MOTOR**
- ✓ **GOODYEAR TIRE & RUBBER**
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- ✓ **IBM**
- ✓ **KIMBERLY-CLARK**
- ✓ **NCR**
- ✓ **PROCTOR AND GAMBLE**

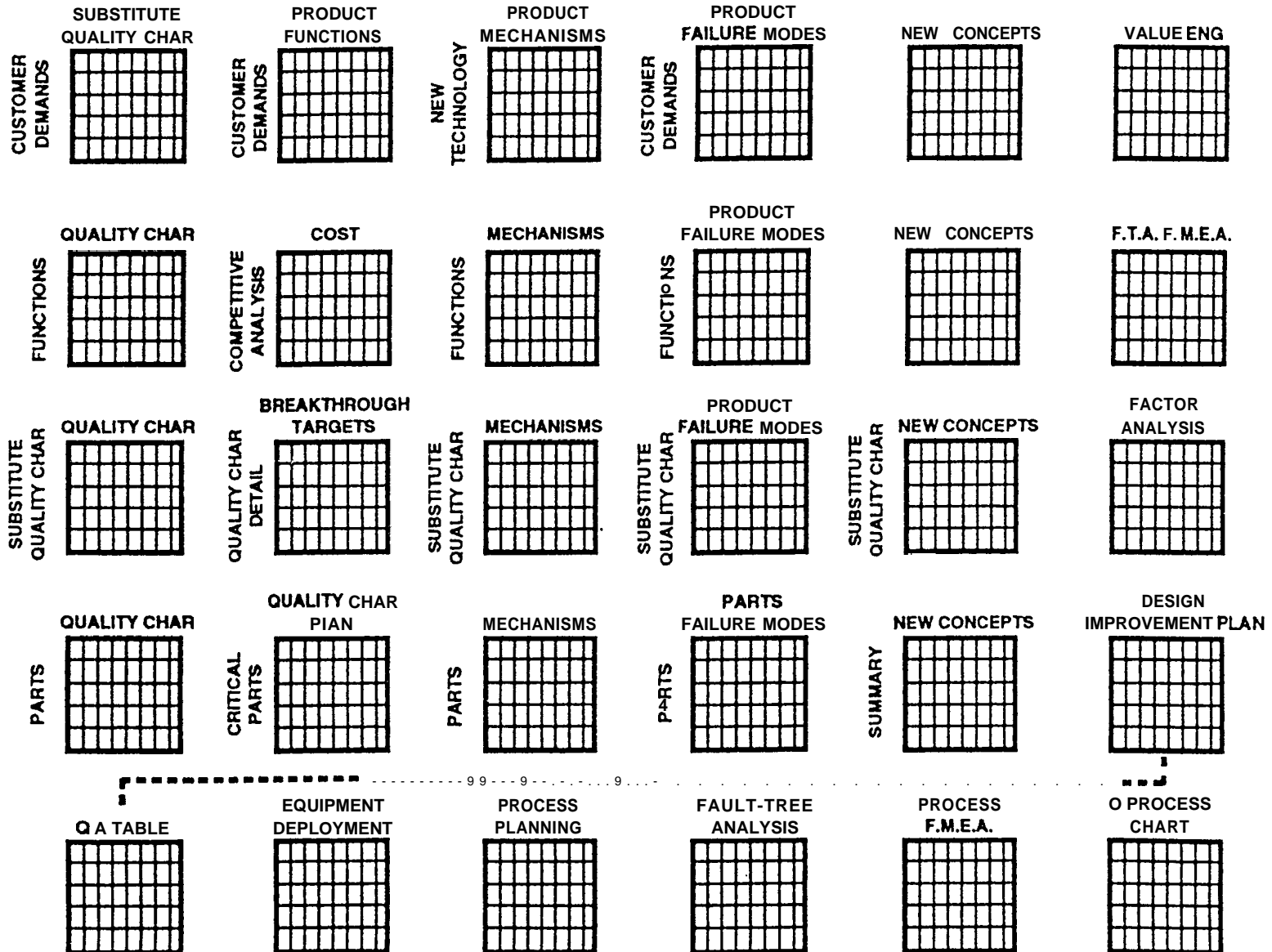
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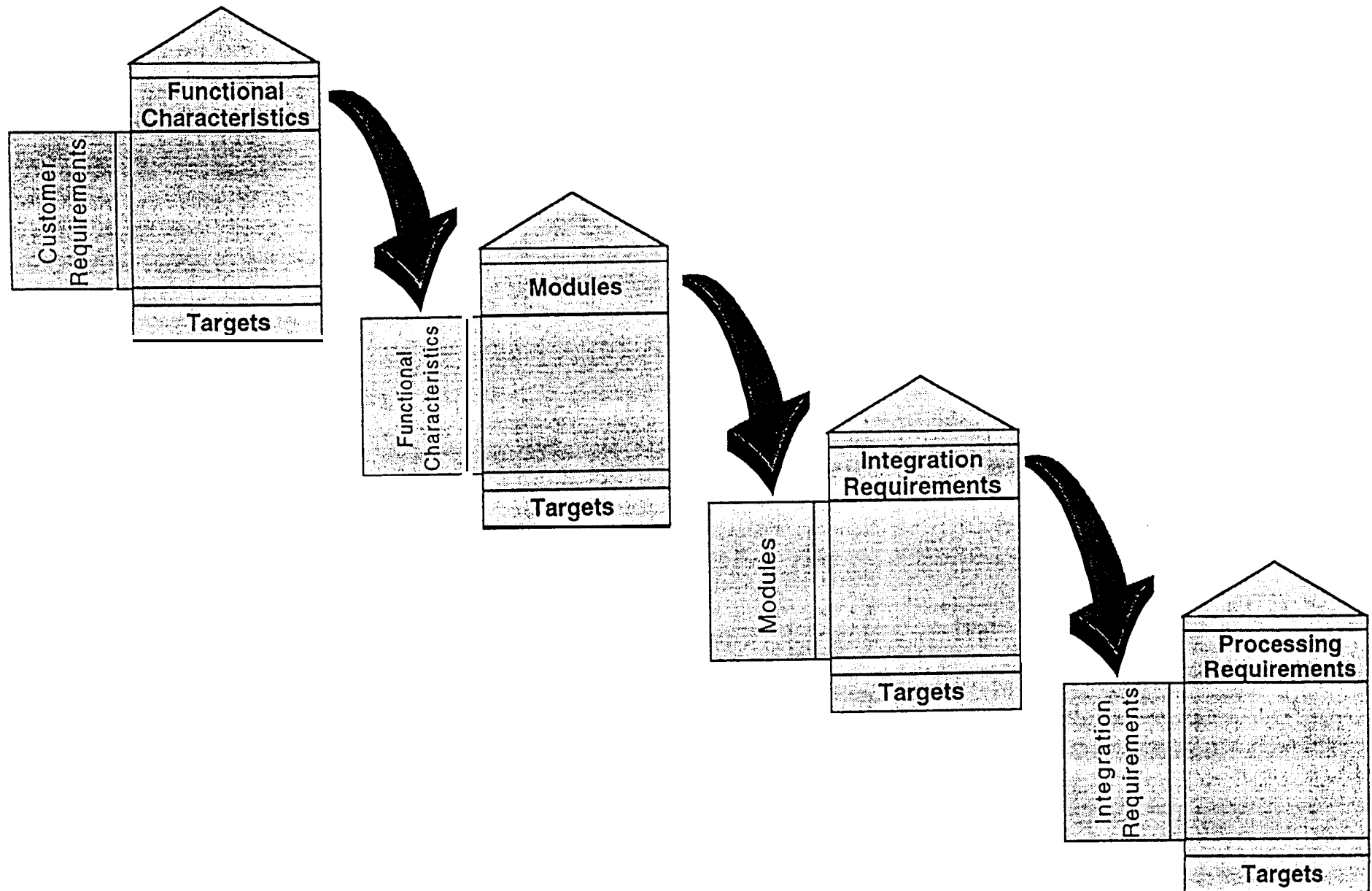
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## Advantages of Using QFD

- IS CUSTOMER FOCUSED, SYSTEMATIC, AND STRUCTURED
- ASSURES PRODUCT CHARACTERISTICS EQUATE TO CUSTOMER REQUIREMENTS
- FORCES ADOPTION OF COMMON TERMINOLOGY BY ALL FUNCTIONAL AREAS
- PRODUCES A DOCUMENTED RECORD OF CONSENSUS FINDINGS
- PROVIDES THE QFD TEAM WITH BETTER MUTUAL UNDERSTANDING OF ALL FUNCTIONAL NEEDS/DESIGNS
- e CAN BE SIMPLISTIC OR SOPHISTICATED, DEPENDING ON NEED
- RESULTS IN FEWER START-UP PROBLEMS/COSTS AND LESS DOWNSTREAM ENGINEERING CHANGES
- HELPS IMPLEMENT CONCURRENT ENGINEERING

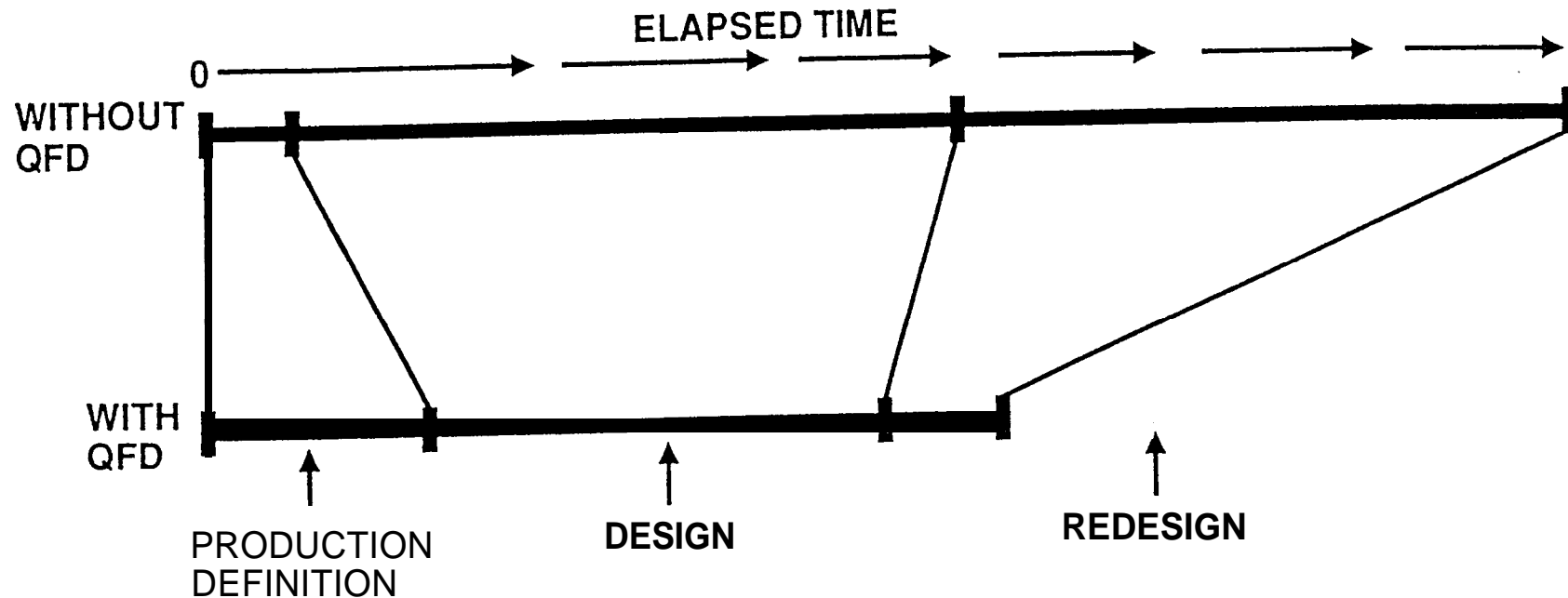


# **Applications of QFD**

- **CLARIFICATION OF ENGINEERING REQUIREMENTS — FORD**
- **IMPROVED SALES — PROCTER & GAMBLE HOTEL PRODUCTS**
- **IMPROVED INTERNAL CUSTOMER/SUPPLIER RELATIONSHIP — DIGITAL EQUIP CORP**
- **IMPROVED EXTERNAL CUSTOMER/SUPPLIER RELATIONSHIP — FORD CLIMATE CONTROL, CIRTEK, GENERAL ELECTRIC, AND OTHERS**
- **IMPROVED MANUFACTURING DOCUMENTATION AND CONTROL — GENERAL ELECTRIC MOTOR**
- **IMPROVED HARDWARE AND SOFTWARE DESIGN — HEWLETT-PACKARD, AND DIGITAL EQUIP CORP**
- **IMPROVED NEW PRODUCT DESIGN AND LAUNCH — MASLAND, AND DEERE CO**
- **NEW DESIGN SYSTEM — THE KENDALL CO**
- **CLARIFICATION AND PRIORITIZATION OF CUSTOMER DEMANDS — DIGITAL EQUIP CO**
- **CUSTOMER-DRIVEN QUALITY CHARACTERISTICS AND QUALITY IN DAILY WORK — FLORIDA POWER AND LIGHT**
- **IMPROVED CONTRACT BIDDING SUCCESS — HUGHES AIRCRAFT**
- **UNDERSTANDING WHO THE CUSTOMERS ARE — POLAROID**

# Benefits

# Comparison of Design Systems with and Without QFD



- RESULT:
- REDUCED CYCLE TIME
  - INCREASED RESPONSIVENESS TO CUSTOMER NEEDS AND TECHNOLOGICAL ADVANCES
  - **REDUCED** COST OF NEW DESIGNS